

WHAT IS CLAIMED IS

1. A rare earth metal-based permanent magnet which has a film layer made substantially of only a fine metal powder directly on a metal forming the surface of the magnet.
2. A rare earth metal-based permanent magnet according to claim 1, wherein said fine metal powder contains at least one metal component selected from copper (Cu), iron (Fe), cobalt (Co), nickel (Ni) and chromium (Cr).
3. A rare earth metal-based permanent magnet according to claim 1, wherein said fine metal powder is a fine copper (Cu) powder.
4. A rare earth metal-based permanent magnet according to claim 1, wherein said fine metal powder has a Vickers hardness value of 60 or less.
5. A rare earth metal-based permanent magnet according to claim 1, wherein said fine metal powder contains at least one metal component selected from Sn, Zn, Pb, Cd, In, Au, Ag and Al.
6. A rare earth metal-based permanent magnet according to claim 1, wherein said fine metal powder is a fine aluminum powder.
7. A rare earth metal-based permanent magnet according to claim 1, wherein said rare earth metal-based permanent magnet is an R-Fe-B based permanent magnet.
8. A rare earth metal-based permanent magnet according to claim 2, wherein said rare earth metal-based permanent magnet is a bonded magnet, and the resinous portion of the surface of said magnet is coated with a film layer made of a fine metal powder which contains at least one metal component selected from Cu,

Fe, Ni, Co and Cr.

9. A rare earth metal-based permanent magnet according to claim 4, wherein said rare earth metal-based permanent magnet is a bonded magnet, and the resinous portion of the surface of said magnet is coated with a film layer made of a fine metal powder having a Vickers hardness value of 60 or less.

10. A rare earth metal-based permanent magnet according to claim 2, wherein said film layer has a thickness in a range of 0.001 μm to 0.2 μm .

11. A rare earth metal-based permanent magnet according to claim 4, wherein said film layer has a thickness in a range of 0.001 μm to 100 μm .

12. A rare earth metal-based permanent magnet according to claim 1, wherein the particles of the fine metal powder have a longer diameter in a range of 0.001 μm to 5 μm .

13. A process for producing a rare earth metal-based permanent magnet, comprising the step of placing a rare earth metal-based permanent magnet and a fine metal powder producing material into a treating vessel, and vibrating and/or agitating both of said permanent magnet and said fine metal powder producing material in said treating vessel, thereby forming a film layer made of a fine metal powder produced from said fine metal powder producing material on a metal forming the surface of said magnet.

14. A process for producing a rare earth metal-based permanent magnet according to claim 13, wherein said treating vessel is

a treating vessel in a barrel finishing machine.

15. A process for producing a rare earth metal-based permanent magnet according to claim 13, wherein the treatment is carried out in a dry manner.

16. A process for producing a rare earth metal-based permanent magnet according to claim 13, wherein said fine metal powder producing material is of a needle-like shape and/or a columnar shape having a longer diameter in a range of 0.05 mm to 10 mm.

17. A rare earth metal-based permanent magnet having a film layer made of a fine metal powder on a metal forming the surface of the magnet, wherein said magnet is produced by placing a rare earth metal-based permanent magnet and a fine metal powder producing material into a treating vessel, and vibrating and/or agitating both of said permanent magnet and said fine metal powder producing material in said treating vessel.

18. A rare earth metal-based permanent magnet according to claim 1 or 17, wherein said rare earth metal-based permanent magnet has a plated film on its surface.

19. A rare earth metal-based permanent magnet according to claim 1 or 17, wherein said rare earth metal-based permanent magnet has a metal oxide film on its surface.

20. A rare earth metal-based permanent magnet according to claim 1 or 17, wherein said rare earth metal-based permanent magnet has a chemical conversion coating film on its surface.